

CLAIMS

The invention claimed is:

1. An imaging system comprising:

a plurality of interrogation segments, each interrogation segment including a segment frame, an antenna array segment mounted relative to the segment frame and having a plurality of segment antenna units configured to transmit toward and receive from a subject in a subject position, electromagnetic radiation in a frequency range of about 200 MHz to about 1 THz, from antenna positions spaced from the subject position, and a segment transceiver mounted relative to the segment frame and configured to operate the associated segment antenna units and produce a segment output representative of the received radiation;

an attachment assembly adapted to attach fixedly the interrogation segments together in a series configuration, with the respective antenna array segments oriented toward the subject position; and

a processor adapted to convert the transceiver output into image data representative of an image of the subject.

2. A system according to claim 1, in which each antenna array segment extends along an arc of A degrees, with the antenna array segments of the plurality of interrogation segments forming an extended arc of $N \times A$ degrees, where N is the number of interrogation segments.

3. An interrogation segment comprising a segment frame, an antenna array segment mounted relative to the segment frame and having a plurality of segment antenna units configured to transmit toward and receive from a subject in a subject position, electromagnetic radiation in a frequency range of about 200 MHz to about 1 THz, from antenna positions spaced from the subject position, and a segment transceiver mounted relative to the segment frame and configured to operate the associated segment antenna units and produce a segment output representative of the received radiation, the interrogation segment being adapted for use in an imaging system including an attachment assembly adapted to attach fixedly a plurality of such interrogation segments together in a series configuration, with the respective antenna array segments oriented toward the subject position, and a processor adapted to convert the transceiver output into image data representative of an image of the subject.

4. An interrogation segment according to claim 3, in which the antenna array segment extends along an arc of A degrees, with the antenna array segments of a plurality of such interrogation segments forming an extended arc of $N \times A$ degrees, where N is the number of interrogation segments.

5. An imaging system comprising:

an array frame;

a plurality of antenna array segments adapted to be mounted to the array frame, each array segment including a segment frame, a plurality of antenna units mounted relative to the segment frame and configured to transmit toward and receive from a subject in a subject position, electromagnetic radiation in a frequency range of about 200 MHz to about 1 THz, from antenna positions spaced from the subject position, the array segments being adapted to be mounted to the array frame with the antenna units from the array segments collectively forming an antenna array;

a transceiver configured to operate the antenna array and produce an output representative of the received radiation; and

a processor adapted to convert the transceiver output into image data representative of an image of the subject.

6. A system according to claim 5, in which the plurality of antenna array segments are oriented at different angles relative to each other.

7. A system according to claim 6, in which the array extends along an arc.

8. A system according to claim 7, in which the plurality of antenna units in each antenna array segment extend rectilinearly along the segment frame relative to which they are mounted.

9. An antenna array segment comprising;

a segment frame;

a plurality of antenna units mounted relative to the segment frame and configured to transmit toward and receive from a subject in a subject position, electromagnetic radiation in a frequency range of about 200 MHz to about 1 THz, from antenna positions spaced from the subject position;

the array segment being adapted to be mounted to an array frame with other array segments with the antenna units from the array segments collectively forming an antenna array as part of an imaging system including a transceiver configured to operate the antenna array and produce an output representative of the received radiation, and a processor adapted to convert the transceiver output into image data representative of an image of the subject.

10. A method of imaging comprising:

transmitting toward a subject in a subject position, electromagnetic radiation in a frequency range of about 200 MHz to about 1 THz, from a plurality of interrogation segments;

receiving at each of the plurality of interrogation segments electromagnetic radiation reflected from the subject;

producing a segment output representative of the radiation received at each interrogation segment; and

converting the segment output into image data representative of an image of the subject.

11. A method according to claim 10, in which transmitting radiation includes transmitting radiation from each interrogation segment with antenna units extending along an arc of A degrees, with the antenna units of the plurality of interrogation segments forming an extended arc of $N \times A$ degrees, where N is the number of interrogation segments.

12. A method of imaging comprising:

transmitting toward a subject in a subject position, electromagnetic radiation in a frequency range of about 200 MHz to about 1 THz, from a plurality of antenna array segments, each array segment including a plurality of antenna units, with the antenna units from the array segments collectively forming an antenna array;

receiving at each of the plurality of antenna array segments electromagnetic radiation reflected from the subject;

producing a segment output representative of the radiation received at each array segment; and

converting the segment output into image data representative of an image of the subject.

13. A method according to claim 12, in which transmitting radiation includes transmitting radiation from antenna array segments oriented at different angles relative to each other along the array.

14. A method according to claim 13, in which transmitting radiation includes transmitting radiation from antenna array segments extending along an arc.

15. A method according to claim 14, in which transmitting radiation includes transmitting radiation from antenna units extending rectilinearly in each antenna array segment.

16. A system of imaging comprising:

means for transmitting toward a subject in a subject position, electromagnetic radiation in a frequency range of about 200 MHz to about 1 THz, from a plurality of interrogation segments;

means for receiving at each of the plurality of interrogation segments electromagnetic radiation reflected from the subject;

means for producing a segment output representative of the radiation received at each interrogation segment; and

means for converting the segment output into image data representative of an image of the subject.

17. A system according to claim 16, in which the means for transmitting radiation is further for transmitting radiation from each interrogation segment with antenna units extending along an arc of A degrees, with the antenna units of the plurality of interrogation segments forming an extended arc of $N \times A$ degrees, where N is the number of interrogation segments.

18. A system of imaging comprising:

means for transmitting toward a subject in a subject position, electromagnetic radiation in a frequency range of about 200 MHz to about 1 THz, from a plurality of antenna array segments, each array segment including a plurality of antenna units, with the antenna units from the array segments collectively forming an antenna array;

means for receiving at each of the plurality of antenna array segments electromagnetic radiation reflected from the subject;

means for producing a segment output representative of the radiation received at each array segment; and

means for converting the segment output into image data representative of an image of the subject.

19. A system according to claim 18, in which the means for transmitting radiation is further for transmitting radiation from antenna array segments oriented at different angles relative to each other along the array.